2: Man G-5 (1869-1880)1932 AZ2 Andamans AZ2

themselves declare that they never haft the stone chips or glass flakes, and that the former are never "sharpened," but produced in the manner already described.

7. Quartz is commonly met with throughout the country occupied by the tribes with which we are in friendly intercourse; no difficulty, therefore, is ever experienced in obtaining *it*, or, indeed, *any* of the other varieties of stone which they use. It is employed for no other purposes than those here indicated, as has been assumed,[1] and the art of producing fire by its means is unknown to them.[2]

8. The whetstone and hammer only are offered as mediums of exchange, but no great value is attached to either of these objects, nor is any superstition associated with their usage: they are therefore—when no longer serviceable—cast aside.

9. Stones are not used by them for cutting wood or bone, the latter being usually crushed by a hammer for the sake of the marrow. Before the introduction of iron, small holes were bored with bone or pieces of shell, but rarely, if ever, with stone, and no implement has been found which might be supposed to have served as a stone saw or scraper, for which purposes shells apparently have been generally employed.[3]

10. In his "Note on the Kjokken-Möddings of the Andaman Islands" the late Dr. Stoliczka also refers to a celt found in one of these refuse heaps as "a small but typical arrow-head," and describes it as of tertiary sandstone. The Andamanese, however, maintain that they never, even when iron was scarce, made arrow-heads, axes, adzes, or chisels of stone; they also affirm that the fragments which have been found in the kitchen-middens, and which have given rise to the impression of having formerly served one or other of the above purposes are merely quartz flakes or broken pieces of cooking stones or hones which, in former times as now, were thrown among the rubbish when no longer of use.[4]

11. Stones are not regarded as thunderbolts or worn as amulets: they are not placed in water previous to their being worked, and holes are never bored in them, nor is the surface ever ground or polished.

[1] "From the flint they manufactured knives . . . and arrow-heads" (de Roepstorff), and elsewhere he speaks of "flint hatchets," which not improbably were as much unknown in former times as at the present day. *Perna ephippium* (*ē'la-*) shells were formerly sharpened and converted into arrow-heads: hence *ē'la-* has ever since been adopted as the name of the bladed (or pig) arrow, even although iron has now been entirely or very generally substituted for shell. Adze blades were, it seems, sometimes made of *Pinna* shells.

[2] *Vide ante* "Fire," paragraphs 1 and 4.

[3] *Vide ante* "Natural Forms," paragraph 1.

[4] *Vide* my remarks on this subject in Journ. Anthrop. Inst., vol. xi, p. 271.

132 **Weather.**—Calm weather can be counted on in February to April and in October. Fogs and chilly night winds are common in January to March in the valleys and inner harbour and also after excessive rain. Off shore breezes at night and on shore breezes in the day are most marked during the calm weather, due to the difference in temperature of sea and land. March and April are often hazy. Magnetic variation in the Andaman sea in 1904, 0° 40′ East, decreasing annually 2′. The normal barometric readings vary between 29·873 and 29·722, being highest in February and lowest in June.

General Statistics.—General meteorological statistics for Port Blair for the last seven years are :—

	1895.	1896.	1897.	1898.	1899.	1900.	1901.
Temperature.							
Mean highest in shade	April 90·1	April 94·7	April 94·0	April 90·3	Mar. 91·8	April 94·1	April 95·1
Mean lowest in shade.	Feby. 70·9	Feby. 71·7	Jany. 72·5	Jany. 70·5	Feby. 71·2	Dec. 72·9	Dec. 71·9
Highest in shade	April 95·2	May 96·9	April 96·8	April 93·8	April 93·8	April 97·0	April 97·1
Lowest in shade	Feby. 68·4	Feby. 66·9	Jany. 67·5	Mar. 65·2	Jany. 67·0	Jany. 68·0	Dec. 67·7
Dry bulb mean	84·8	85·5	85·2	84·3	84·8	90·6	91·7
Wet bulb mean	75·9	79·6	79·7	78·4	78·6	83·5	83·6
Rainfall.							
Most wet days in a month	Aug. 28	Aug. 28	July 29	July 26	Sept. 27	June 27	Aug. 29
Heaviest fall in a month	June 26·29	May 27·55	July 30·97	May 40·53	Sept. 24·33	Sept. 15·44	May 20·81
Months without rain	Jany. Feby.	Feb by. Mar.	January	Feby. Mar.	Nil.	February	Nil.
Total wet days	183	179	190	160	177	162	158
Wind.							
N. N. E.	Jany., Feby., Mar., Dec.	Jany. Feby. Mar., Nov., Dec.	Jany., Feby., Dec.	Feby., Dec.	Feby., Nov., Dec.	Jany., Mar., Nov., Dec.	Jany. Feby.
E. S. E.	April, Oct., Nov.	...	Mar., April Nov.	...	April, Oct.	...	...
W. S. W.	May, June, July, Aug., Sept.	June, July, Aug., Sept.	May, June, July, Aug. Sept. Oct.	May, June, July, Aug., Sept.	May, June, July, Aug., Sept.	May, June, July Aug., Sept.	May, July, Aug., Sept. Oct.
W. N. W.	...	April, May, Oct.	...	...	...	April	June.
E. N. E.	...	...	...	Jany., Mar., April	March.	...	...
S. S. E.	...	...	...	Oct., Nov.	...	October	April, Nov.
N. E.	...	...	...	...	January	February	Mar., Dec.
Clouds.							
Clouds are usually	F. K. & C. F. K. & P. C. *	C. & K.—P. K. & P. C. *	P. K. & P.C. *	Cu. N. Acn. Ci *	Cu. N. Acn. Ci *	Cu. Acn. N. Ci *	Cu. Acn. N. Ci *

* F. K = Pallio-Cumulus : C & Ci = Cirrus : P. C. = Pallio-Cirrus : K. = Cumulus : Cu. N = Cumulo-Nimbus : Acn. = Alto-Cumulus.

Tide.—The tidal observatory with self-registering gauge on Ross Island, established in 1880, is in latitude 11° 41′ N., longitude 22° 45′ E. The Port Blair tide tables are printed by authority from local data. The heights are referred to the Indian spring low-water mark, which for Port Blair is 3·53 feet below mean sea level. The mean range of greatest ordinary springs is 6·6 feet. The highest high-water and the lowest low-water are 8·0 feet above and 0·8 feet below the datum above mentioned. The apparent time of high-water at the full and change of the moon is 9h. 36m At various points of the great harbour of Port Blair the actual times for the tide depend on wind, strength of current, and distance from the open sea. The average variation in time of high tides at the several important points is from 18m. to 57m. later than Ross and in height it is from 20 inches less to 17 inches more than Ross. Wind and current will at these points affect time by as much as 29m. either way, and height by as much as 8 inches either way.

III. Geology.

135 133 **General Geology.**—There has been no geological survey of the Andamans, but expeditions by experts have been officially undertaken to make preliminary examinations of the islands. These examinations have been carried on under practical difficulties of every kind, not the least being the dense and lofty forests with which the entire islands are covered. Judging by the reports of such

135 expeditions, the submarine ridges forming these islands contain much that is geologically characteristic of the Arakan Yomas and formations common also 133 to the Nicobars, to the islands off Sumatra and to Sumatra itself. The older rocks, common also in the same form to the Nias Islands on the West Coast of Sumatra are probably early tertiary or possibly late cretaceous, but there are no fossils to indicate age. The newer rocks common to the Nicobars and Sumatra are in Ritchie's Archipelago chiefly and contain radiolarians and foraminifera. There is coral along the coasts everywhere and the Sentinel Islands are composed of the newer rocks with a superstructure of coral, but no atoll is known in the vicinity of the Islands. There is a good deal of serpentine rock, also some jasper, chromite, and copper and iron pyrites, and small pockets of coal. About Port Blair a firm grey sandstone identifiable with the Negrais rocks occurs with interbedded slaty shales, and not infrequently nests of coaly matter and occasionally of conglomerate and pale grey limestones. This sandstone is the characteristic rock of the neighbourhood and is generally, if not always, non-calcareous. In the Archipelago and over a large area in the Andamans, the islands are formed of soft limestones made of coral and shell sand, soft calcareous sandstones and soft white clays, with occasionally a band of conglomerate. Green and red jaspery beds, similar to those of Manipur and Burma and the Nicobars, are found, which may belong to the same series as the sandstones and shales. On Entry Island in Port Meadows are beds of probably volcanic origin, perhaps later than the Port Blair sandstones. Intrusive rocks of the serpentine series and a scoriaceous rock resembling lava occur in the Cinque Islands, Rutland Island, and in spots on the South and Middle Andamans. Hard breccias of volcanic origin are found at Namunaghar in the Penal Settlement and yield an excellent building stone. Good red clay for bricks is found abundantly in pockets. Lime of the best quality is obtained from old coral, but a workable limestone exists in limited quantities. A pretty reddish building marble is also found. Red ochre (*kcioh*) is found in considerable quantities in pockets and used, when mixed with gurjan oil, as an excellent covering for shingled roofs. Mica in probably workable quantities has been found about Navy Bay Hill in Port Blair Harbour.

133 **The Subsidence of the Islands.**—A theory of a still continuing subsidence of the islands was first formed by Kurz on his investigation of the vegetation in 1866 and has since been confirmed by Oldham in his geological report of 1884, though with some reluctance owing to the fact that the Arakan Coast to the north and the Nicobars are showing signs of recent elevation. The subsidence seems to be of recent origin, and signs of its continuance, most markedly on the East Coast, are to be found at several places:—Port Mouat, Ranguchang on the East Coast of the South Andaman near Port Blair, Outram Harbour and Havelock Island in the Archipelago, the northern ends of the Little Andaman, the North Sentinel, and the North Andaman. The extremely interesting islands of Narcondam and Barren Island are volcanoes of the general Sunda group, the extinct volcano of Narcondam belonging apparently to what is known as the Pegu group and the quiescent Barren Island to the Sunda group proper. Barren Island was last in eruption in 1803, but there is still a thin column of steam from a sulphur bed at the top and a variable hot spring at the point where the last outburst of lava flowed into the sea, showing lately a temperature of 107° Fahr.

Earthquakes.—Although the Andamans lie along or at any rate are close to a recognised subterranean line of weakness, earthquakes of great violence have not so far in the short time of British occupation been recorded. Recorded dates of earthquakes are August, 1865; February, 1880; and then shocks at times till December 31st, 1881; February, 1882; August, 1883; July, 1886; July, 1894; October, 1899. The sound of the great seismic disturbance in the Straits of Sunda on August 26, 1883, was heard at Port Blair at 9 P.M. of that day and the extra tidal waves caused thereby were felt at 7 A.M. on the 27th. The great Assam Earthquake of 1897 was not felt at all.

It is possible that the reason for the Andamans escaping violent earthquakes while the Nicobars are subject to them is that they are just off the line of greatest weakness, which may run from Sumatra through Great and Car Nicobar, Barren Island, Narcondam to the Arakan Yoma.

10: Sen K-3, 4 (ca. 1955) 1962 AZ2 Andamans AZ2

INTRODUCTION

A group of north-south running islands as they are, the Andaman Islands have as many as 204 small islands where the impact of civilisation and growth has been little and the human history has been one of stagnation rather than of chequered career. Being a land of aborigines, the foreign intrusion has been quite feeble though mention about these islands is found in the early records of the travellers. Though the knowledge about the islands is derived from the notes which date back to 2nd Century A.D., the contacts with the foreigners have been all the time transient and extremely feeble. Before the formation of the penal settlement, the islands have been known as an island of horror because of the presence of such tribal people who would eat up the man they encounter and as regards the wealth there has been imaginary illusion, sometimes being called as the Island of Gold. The historical record of the islands which can be built with a fair degree of precision is since the formation of the penal settlement. There has been the search for resources as well as their exploitation. However, all the attempts for finding minerals and the geological explorations have shown the possibility of the existence of some poor quality coal, copper etc. Virtually there has been a conspicuous lack of efforts for the development of the islands. The penal settlement which grew up in Port Blair did not have any considerable influence on the overall development of the islands. Nevertheless with the more intimate knowledge about the islands, the forest exploitation had increased and the land around Port Blair was cleared for agriculture. The little amount of agriculture that was started and fostered by the local-borns in and around Port Blair never expanded considerably and it remained confined to a few areas of South Andaman only. The aborigines were very much widespread and in the beginning they had exercised hostility and arrogance which had in course of time given place to a very friendly and amicable terms with some of the tribal groups i.e. the Onges and the Andamanese. The Jarawas, however, still now maintain their hostility and the attempts for bringing them under amicable terms have so long proved futile.

Nothing more deserves a special note in the islands than the aboriginal population. Because of the insular nature of the islands, the aboriginal population is considered to be one of the purest type though the foreign intrusion has brought about an extremely rapid impoverishment and decay only during the last few decades of contact with these aborigines.

10:Sen K-3, 4 (ca. 1955) 1962 AZ2 Andamans AZ2

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CHAPTER VII

MINERAL RESOURCES

135 The mineral resources in the Andamans were believed to be bountiful. There had been mentions in the earlier notes of many travellers and historians (e.g. Nicolo Conti) about the richness of the islands in gold and they have gone so far as to call these islands as the "Island of Gold". But unfortunately no gold has yet been found in the Andamans nor is there any reason to suppose that it will be found. In this [64] connection it may be recalled that Dr. Helfer, a Russian Geologist was killed by the aborigines while he was making geological prospecting in search of gold. M. V. Portman discovered specimens of various minerals in the neighbourhood of Port Blair and they are chromium, copper, iron and sulphur. As such the land seemed to be sufficiently promising and Mr. Mallet[1] proceeded to Port Blair for further investigations. But unfortunately no important deposit of any mineral has been found to occur except some nests of lignite and bands of pure limestone in scattered places and in the serpentine rocks specially in the northeast part of Rutland occur small crystals of bronzite.

A few miles south of Port Blair near about Rangachang, highly altered and eruptive rocks are found being traversed by veins, the main constituent of which is hematite, but which consist of a considerable portion of pyrite (iron pyrites) and chalcopyrite (copper pyrite) in much smaller quantity.

Of the above-mentioned minerals, none are found to be economically exploitable. It has been argued that the Andamans cannot be rich in minerals because the Arakan Yoma of Burma also shows a barrenness in minerals and the only ores which need be noticed for practical purposes are those of tin, iron, lead, copper, antimony, none of which save iron, are known west of Sittang. But the apparent barrenness of the Arakan hills, however, can not be taken as conclusively proving that the Andamans are equally unproductive. It is believed that the Japanese carried out a full mineral survey of the islands and are reported to have found deposits including coal, iron and precious stones.

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[113] 1. Mallet, F. L. On some of the mineral reasources of the Andaman Islands in the neighbourhood of Port Blair, Rec. G.S.I. Vol. XVII, 1884.

10: Sen K-3, 4 (ca. 1955) 1962 AZ2 Andamans AZ2

Coal:

It is of very poor quality and occurs in pockets in the sandstones, associated with poorly preserved leaf impressions. No sign of continuous seam has been observed in the islands. The coal deposits of the islands are of the same age as the coal bearing strata of Beluchistan. But unfortunately no coal is economically exploitable. 135

Under such circumstances of poor knowledge regarding the minerals of the islands, nothing can be said regarding the future mineral position of the islands. Immediate measures should be taken for the proper mineral investigation of the islands for future programmes of setting up industries.

[Pp. 48-50 contain No text material]